

Chromosome Number and Systematic Position of *Odontocline* (Compositae-Senecioneae)

Bertil Nordenstam

Swedish Museum of Natural History

S-104 05 Stockholm, Sweden

Abstract

The somatic chromosome number $2n = 60$ was counted in two species of *Odontocline* B. Nord., a genus of the Compositae endemic to Jamaica. The systematic position of the genus within the tribe Senecioneae is discussed in the light of morphological, chemical and cytological evidence.

Introduction

The genus *Odontocline* B. Nord. contains six species, all endemic to the island of Jamaica (Nordenstam 1978). The systematic position and affinities of the genus within the tribe Senecioneae are somewhat obscure. Some important diagnostic features such as the 'radial' endothecium and 'senecioid' filament collar indicate a position in the subtribe Senecioninae. The continuous stigmatic surface of the disc-floret style branches is a somewhat anomalous character in this context. Other characteristic features are broad petiolate leaves, terminal compound syn-florescences with yellow fragrant flowerheads, caudate anther bases, conical or obtuse tips of style branches without a central tuft, and tooth-like receptacular projections.

Material and methods

On the assumption that phytochemical and cytological data might shed some light on the relationships of *Odontocline*, material for chemical analysis and for cultivation was collected in Jamaica by the present author in 1980. The chemical study was performed by Bohlmann et al. (1981), and plants were raised from seeds in greenhouses in Stockholm. For chromosome counts root-tips were pre-treated in colchicine, fixed in Carnoy's solution, and squashed in aceto-orcein.

Results

Odontocline hollickii (Britton ex Greenm.) B. Nord. - Jamaica, Trelawney: 3.5 miles above Kinloss on road to Barbecue Bottom, limestone cliffs at roadside, 400 m s.m., 22.III.1980, Nordenstam 7901 (S voucher). - $2n = 60$.

Odontocline glabra (Sw.) B. Nord. - Jamaica, Hanover: N slopes of Dolphin Head, steep forested limestone slope, 400 m s.m., 31.III.1980, Nordenstam 7917 (S voucher). - $2n = 60$ (Fig. 1).

Discussion

The 'senecioid' complex comprises a large number of genera centered around the core genus *Senecio*. This complex is now accommodated in the subtribe Senecioninae (Jeffrey & Chen 1984), whereas the 'cacalioid' complex is recognized as subtribe Tussilagininae. A number of Old World senecioid genera with tailed anthers are referred to as the 'synotoid' complex (Jeffrey & Chen 1984, Jeffrey 1986), with *Synotis* as the largest genus.

The basic chromosome number in the Senecioninae is $x = 10$, many taxa being diploid with $2n = 20$, but tetraploids ($2n = 40$) and hexaploids ($2n = 60$) as well as higher numbers are frequent. Reduced numbers of $2n = 10$ also occur, e.g. in the *Emilia* group.

In Tussilagininae the basic number is $x = 24-30$, which can be interpreted as a descending series from $x = 30$, an ancient polyploid level.

The number $2n = 60$ found in *Odontocline* is thus not conclusive as regards the taxonomic position of the genus. It can be interpreted as a hexaploid senecioid based on $x = 10$ or as a diploid cacalioid based on $x = 30$.

The morphological evidence indicates a position in subtribe Senecioninae, although some characters are somewhat anomalous, as pointed out above. The most closely related genus is probably *Jacmaia*, a monotypic genus likewise endemic to Jamaica. A striking difference is the appendaged *Jacmaia* style, which accounts for the former placement of this taxon in *Gynoxys*, whereas *Odontocline* until twelve years ago was retained in the over-expanded concept of *Senecio*. Several morphological characters indicate a close relationship between these two genera, however, such as the tailed anthers, the continuous stigmatic areas of the style branches, the receptacular projections, and the general habit with broad petiolate leaves. *Jacmaia* and *Odontocline* can be regarded as sister groups, but their further affinities remain obscure. Possibly the South and Central American genus *Pentacalia* is the best candidate as already suggested by Robinson & Cuatrecasas (1978). The caudate anther base is one character in common, as well as

the fruticose habit with petiolate flat leaves, but there are also significant differences in style and achene morphology.

The chemical evidence also indicates a close relationship between *Odontocline* and *Jacmaia* (Bohlmann et al. 1981). The absence of furanoeremophilanes and the occurrence of acylpyrroles may seem to suggest relationship to some senecioid groups now outside *Senecio* s.str. For example, some specialized African 'synotoid' genera (*Mikaniopsis*, *Delairea*) are also characterized by the lack of furanoeremophilanes and the presence of acylpyrroles (Bohlmann et al. 1979). This is probably not indicative of a close relationship to the Jamaican genera, however, but more likely the result of parallel evolution. Bohlmann et al. (1979) point out that several members of the Senecioneae have independently lost the ability to synthesize furanoeremophilanes, and some of these instead produce various triterpenes or acylpyrroles. The latter are derived from pyrrolizidine alkaloids, which are generally occurring throughout the tribe.

In summary, then, the chromosome number of $2n = 60$ is inconclusive as regards the affinities of *Odontocline*. The chemical evidence is difficult to interpret at this stage. Morphology indicates a relationship of *Odontocline* and its sister group *Jacmaia* to the more widespread *Pentacalia*. These genera may form a New World 'pentacaloid' complex distinct from the 'synotoid' complex of the Old World. The phylogeny of this complex needs to be further studied.

Acknowledgements

My thanks are due to Dr. Mari Källersjö for skilful chromosome preparations. Financial assistance from the Swedish Natural Science Research Council (grant B-BU 2401-303 for Compositae taxonomy) is gratefully acknowledged.

References

- Bohlmann, F., Zdero, C., Berger, D., Suwita, A., Mahanta, P. & Jeffrey, C. 1979. Neue Furanoeremophilane und weitere Inhaltsstoffe aus südafrikanischen *Senecio*-Arten. - *Phytochemistry* 18: 79--93.
- Bohlmann, F., Gupta, R. K. & Jakupovic, J. 1981. An acylpyrrole derivative and further constituents from Jamaican representatives of the tribe Senecioneae. - *Phytochemistry* 20: 831--832.
- Jeffrey, C. 1986. The Senecioneae in East Tropical Africa. Notes on Compositae: IV. - *Kew Bulletin* 41: 873--943.
- Jeffrey, C. & Chen, Y.-L. 1984. Taxonomic studies on the tribe Senecioneae (Compositae) of Eastern Asia. - *Kew Bulletin* 39: 205--446.
- Nordenstam, B. 1978. Taxonomic studies on the tribe Senecioneae (Compositae). - *Opera Bot.* 44: 1--83.
- Robinson, H. & Cuatrecasas, J. 1978. A review of the Central American species of *Pentacalia* (Asteraceae: Senecioneae). - *Phytologia* 40: 37--50.

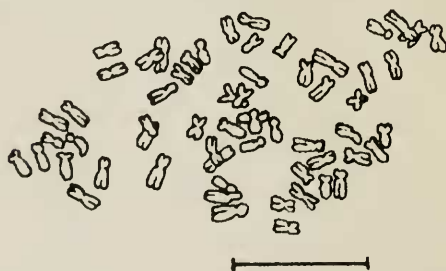


Fig. 1. Somatic metaphase plate of *Odontocline glabra*, $2n = 60$. The scale is 10 μm .